IN THE CLAIMS:

Please amend the claims as follows:

1. (Previously Presented) A memory storage structure, comprising:

at least one memory storage device;

a first meta-structure having a first size and operating at a first speed, which is faster than a second speed for storing meta-information based on information stored in a memory;

a second meta-structure hierarchically associated with the first meta-structure, the second meta-structure having a second size larger than the first size and operating at the second speed such that faster and more accurate prefetching is provided by coaction of the first and second meta-structures; and

a meta-collector configured to collect and record look ahead context information in the meta-information which includes at least one of spatial and temporal state information associated with access of entries in a meta-structure and a memory location, such that the meta-collector provides prefetching of history table entries to the first meta-structure based upon the look ahead context information.

2. (Original) The structure as recited in claim 1, wherein the first and second meta-structures include branch history tables and the meta-information includes branch history data.

3. (Original) The structure as recited in claim 2, further comprising a predicted branch table for identifying a sequence of predicted taken branches that a processor will soon encounter.

4. (Original) The structure as recited in claim 1, wherein the meta-information includes temporally sequential information that is likely to be used in the near future.

5. (Original) The structure as recited in claim 1, wherein the meta-information includes spatially sequential information that is likely to be used in the near future.

6. (Original) The structure as recited in claim 1, wherein the meta-information is correlated to program flow in a processor.

7. (Original) The structure as recited in claim 1, wherein the at least one memory storage device includes a cache.

8. (Original) The structure as recited in claim 7, wherein at least one of the meta-structures are incorporated in the cache.

9. (Original) The structure as recited in claim 7, wherein the cache is hierarchically arranged.

10. (Original) The structure as recited in claim 9, wherein the hierarchically arranged cache includes a first level cache line and a second level cache line.

11. (Cancelled)

12. (Previously Presented) The structure as recited in claim 1, wherein the meta-information includes at least one of a branch address (BA) and a predicted target address (TA) for information to be prefetched.

13. (Currently Amended) A memory storage structure, comprising:

a cache;

a meta-structure hierarchically arranged in accordance with a size and speed such that faster and more accurate prefetching is provided by coaction of hierarchical meta-structures; and

a meta-collector configured to collect and record look ahead context information including temporally and spatially sequentially unique meta-information related to access of entries of a meta-structure, each corresponding to a cache line to enable the hierarchical meta-structure operation to provide prefetching of the meta-information entries to a fastest meta-structure level based upon look ahead context information.

14. (Original) The structure as recited in claim 13, wherein the meta-structures include branch history tables and the meta-information includes branch history data.

15. (Original) The structure as recited in claim 14, further comprising a predicted branch table for identifying a sequence of predicted taken branches that a processor will soon encounter.

16. (Original) The structure as recited in claim 13, wherein the meta-information is correlated to program flow in a processor.

17. (Original) The structure as recited in claim 13, wherein at least one meta-structure is incorporated in the cache.

18. (Original) The structure as recited in claim 13, wherein the cache is hierarchically arranged.

19. (Previously Presented) The structure as recited in claim 18, wherein the hierarchically arranged cache includes a first level cache and a second level cache.

20. (Original) The structure as recited in claim 19, wherein the meta-information includes at least one of a branch address (BA) and a predicted target address (TA) for information to be prefetched.

21. (Original) The structure as recited in claim 13, further comprising a plurality of memory storage structures arranged to prefetch information for stages of a circuit.

22. (Currently Amended) A method prefetching meta-information, comprising the steps of:

providing a memory storage structure having a cache, meta-structures hierarchically arranged in accordance with size and speed, and a meta-collector which collects and records

one of temporally and spatially sequentially unique meta-information ~~related to access of~~ including a sequence of accessed entries of a meta-structure ~~and~~ corresponding to a cache lines; and

prefetching meta-information for storage in the meta-structures such that improved speed is provided by coaction of hierarchical meta-structures.

23. (Original) The method as recited in claim 22, wherein the step of prefetching includes associating cache lines with information addresses in the meta-collector.

24. (Original) The method as recited in claim 22, wherein the meta-structures include branch history tables and the meta-information includes branch history data.

25. (Original) The method as recited in claim 22, further comprising the step of identifying a sequence of predicted taken branches that a processor will soon encounter by employing a predicted branch table.

26. (Original) The method as recited in claim 22, further comprising the step of correlating the meta-information to program flow in a processor.

27. (Original) The method as recited in claim 22, further comprising the step of evicting cache line information from the meta-collector when a corresponding cache line is replaced.

28. (Original) The method as recited in claim 22, further comprising the step of storing evicted information to a next level memory area in a cache hierarchy.

29. (Previously Presented) The method as recited in claim 22, further comprising the step of on a cache miss, writing to a next level memory area in a cache hierarchy, a cache miss address.

30. (Original) The method as recited in claim 22, further comprising the step of updating meta-information between levels of the hierarchical meta-structures.

31. (Original) The method as recited in claim 30, wherein the step of updating includes updating meta-information by copying the meta-information between a level of a cache and a level of a branch history table.

32. (Original) The method as recited in claim 30, wherein the step of updating includes updating meta-information by copying the meta-information between a first level of a cache and a second level of a cache.

33. (Original) The method as recited in claim 30, wherein the step of updating includes updating meta-information by copying the meta-information between a first level of a meta-structure and a second level of a meta-structure.

34. (Original) The method as recited in claim 30, wherein the step of updating includes

updating meta-information by copying the meta-information to/from a meta-collector.

35. (Original) The method as recited in claim 22, further comprising the step of accumulating meta-information by transferring the meta-information between entities such that new meta-information is added upon each transfer.

36. (Previously Presented) A method for processing a temporal sequence of events, wherein the events have spatial context, the method comprising the steps of:

capturing a set of entries in a meta-structure in temporal order, the entries including information associated with each entry;

storing sub-sequences of temporal entries, which share spatial context as monolithic entities wherein each monolithic entity is associated with a particular spatial context; and

when a new spatial context is encountered in the temporal sequence, creating a new monolithic entity associated with the new spatial context, the new spatial context including a temporal sub-sequence of events now associated with the new spatial context.

37. (Original) The methods as recited in claim 36, further comprising the step of storing the monolithic entities associated with the spatial contexts in their temporal order of occurrence.

38. (Original) The method as recited in claim 36, wherein the monolithic entities include multi-dimensional data.

39. (Original) The method as recited in claim 38 wherein one of the multi-dimensions includes a spatial dimension.

40. (Original) The method as recited in claim 38 wherein one of the multi-dimensions includes a temporal dimension.

41. (Original) The method as recited in claim 38 wherein one of the multi-dimensions includes metadata.

42. (Original) The method as recited in claim 36 wherein the information includes metadata.

43. (Original) The method as recited in claim 36, further comprising: storing the monolithic entities at a location determined by spatial context of the monolithic entities.

44. (Original) The method as recited in claim 36, further comprising: storing the monolithic entities at a location determined by temporal context of the monolithic entities.

45. (Original) The method as recited in claim 36, further comprising: retrieving monolithic entities from storage in accordance with spatial content of the said monolithic entities.

46. (Original) The method as recited in claim 45, further comprising: using metadata

associated with the monolithic entities by a processor after the monolithic entities are retrieved.

47. (Original) The method as recited in claim 36, further comprising: retrieving monolithic entities from storage in accordance with temporal content of the said monolithic entities.

48. (Original) The method as recited in claim 47, further comprising: using metadata associated with the monolithic entities by a processor after the monolithic entities are retrieved.